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The Impact of Medicaid Status on Stage of Cervical Cancer at Diagnosis

Andrea Hedblom

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Abstract

Background: In 2012, new diagnoses of cervical cancer in the United States are estimated to affect 12 170 women, and 4220 women will die from the disease. Despite the fact that cervical cancer is easily detected and testing is inexpensive, approximately 50 percent of those diagnosed will present with late stage disease at the time of diagnosis. Women who are uninsured or Medicaid-insured have an increased risk of being diagnosed with late stage cervical cancer. The purpose of this systematic review is to examine the relationship between the timing of Medicaid enrollment and the stage of cervical cancer at the time of diagnosis to better identify populations at increased risk.

Method: An exhaustive search of the literature was conducted in Medline (Ovid), CINAHL, and Web of Science using the following search terms: *Medicaid, neoplasm, cervical cancer* and *uterine cervical neoplasms.* Studies that compared Medicaid-insured patients and non-Medicaid-insured patients, along with the stage of cervical cancer at the time of diagnosis were included.

Results: A total of 32 studies were screened, and four studies met the eligibility criteria for this systematic review. One study was defined as a cross-sectional study. Three studies were retrospective cohorts. All studiesincluded in this review demonstrated an increased risk of late stage cervical cancer at the time of diagnosis that was dependent upon the timing of Medicaid enrollment. Enrollment prior to diagnosis was associated with less risk overall. Women enrolling in Medicaid at the time of diagnosis were three times more likely to present with late stage disease, and those enrolling after diagnosis had a five-fold increase in risk.

Conclusion: The results from this systematic review demonstrate a trend of increased risk of late stage cervical cancer for women whose enrollment in Medicaid is close to, on, or after diagnosis. Continuous and/or prolonged enrollment prior to diagnosis was associated with less risk overall, and may be analogous to non-Medicaid insured women. The increased risk for women who enroll in Medicaid after diagnosis underscores the need to increase outreach to underserved women who do not qualify for Medicaid until they have been diagnosed with cervical cancer or precancerous lesions.

Keywords: *Medicaid, cervical cancer, cancer stage at diagnosis*

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First Advisor
Annjanette Sommers MS, PA-C

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The Impact of Medicaid Status on Stage of Cervical Cancer at Diagnosis

Andrea C. Hedblom

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Faculty Advisor: Annjanette Sommers, PA-C, MS

Clinical Graduate Project Coordinator: Annjanette Sommers, PA-C, MS

Biography

[Information redacted for privacy]

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The Impact of Medicaid Status on the Stage of Cervical Cancer at Time of Diagnosis

BACKGROUND

According to the National Cancer Institute, implementation of cervical cancer screenings utilizing the Pap test has reduced mortality from cervical cancer by 75 percent nationwide.[1] In 2012, new diagnoses of cervical cancer in the United States are estimated to affect 12 170 women, and 4220 women will die from the disease.[2]

Cancer stage at diagnosis is strongly associated with survival rate. The 5 year relative survival percentage is 90.9 percent for localized cervical cancer, 56.9 percent for regional cervical cancer, and 16.5 percent for distant cancer.[3] Furthermore, precancerous cervical lesions can be detected with the Pap test and treated before becoming cancerous and localized disease is amenable to treatment.[1-2]

Despite the fact that cervical cancer is easily detected and testing is inexpensive,[1] approximately 50 percent of those diagnosed will present with late stage disease at the time of diagnosis.[3] Specific populations and geographic regions in the United States continue to have high cervical cancer incidence and death rates.[2-3] Women at increased risk for mortality from cervical cancer tend to have a lower socio-economic status, have a lower level of education, belong to a racial minority, live in rural areas, and be uninsured or Medicaid-insured.[1,3,11]

The vast majority of adults enrolled in Medicaid are women whose income is below the federal poverty level.[6,10] And of those women, nearly two-thirds are between the ages of 19 – 44.[10] In general, women enrolled in Medicaid share many of the same demographic characteristics as those with increased risk for mortality from cervical cancer mentioned previously.[10,11] Prior to the enactment of The Breast and Cervical

Cancer Prevention and Treatment Act of 2000 (BCCPT), women newly diagnosed with cervical cancer were eligible for enrollment in Medicaid after diagnosis only if they met Medicaid's enrollment criteria.[7,13] Since 2001, The BCCPT Act has given states the option to allow women who are newly diagnosed with breast or cervical cancer to be enrolled in Medicaid if they are uninsured and not eligible for Medicaid, less than 65 years old, and were screened and found to have cancer through the National Breast and Cervical Cancer Early Detection Program (NBCCEDP).[10,13] Women enrolling in Medicaid after a cancer diagnosis are more likely to be impoverished, uninsured, or underinsured, with limited access to preventative services.[8]

The purpose of this systematic review is to examine the relationship between the timing of Medicaid enrollment and the stage of cervical cancer at the time of diagnosis to better identify populations at increased risk. This review is relevant at this time as many states are facing budget shortfalls; and Medicaid, which serves the poorest and sickest,[9] is facing cuts in services and funding at a time when Medicaid rolls are increasing.

METHODS

An exhaustive search of the literature was conducted in Medline (Ovid), CINAHL, and Web of Science using the following search terms: *Medicaid, neoplasm, cervical cancer* and *uterine cervical neoplasms.* Reference lists of selected articles were also reviewed in order to identify additional studies.

Studies that compared Medicaid-insured patients and non-Medicaid-insured patients, along with the stage of cervical cancer at the time of diagnosis were included. Publication time was not limited.

Articles were evaluated for validity using the GRADE criteria.[12] Articles were placed in the following categories based on the quality of evidence: high, medium, low, and very low. Table 1 summarizes the GRADE system as applied.

RESULTS

A total of 32 articles were screened, and four studies[5-8] met the eligibility criteria for this systematic review. One study[8] was defined as a cross-sectional study. Three studies[5-7] were retrospective cohorts. All studies[5-8] included in this review demonstrated an increased risk of late stage cervical cancer at diagnosis based upon the timing of Medicaid enrollment.

Medicaid Status and Stage at Diagnosis of Cervical Cancer

O'Malley et al (2006)

O'Malley et al[5] performed a retrospective cohort study utilizing the California Cancer Registry (1996 – 1999) and Medicaid enrollment files (1995 – 1999) to compare the stage at diagnosis of cervical cancer and Medicaid status (n=888). Women between the ages of 15 and 64 with a diagnosis of cervical cancer as their first invasive cancer and whose month of diagnosis was known were included in the analysis. Non-Medicaid (n=3794) enrolled women served as the reference category. Categories of Medicaid enrollment were divided into 3 groups: enrolled in the month of diagnosis (n=142), enrolled 1-11 months before diagnosis (intermittent enrollment, n=210), and those enrolled continuously in all 12 months (n=536) before diagnosis. Additional variables of

interest were age (15 – 64 years), race, socio-economic status, marital status, and histology.[5]

Stage of cancer was defined as: early (local) or late (regional and remote). Late stage cancer at diagnosis was associated with length of Medicaid enrollment: women who enrolled the same month as diagnosis (71% late stage), compared with enrollment 1-11 months prior to diagnosis (50% late stage), and those enrolled continuously in all 12 months prior to diagnosis (46%). In comparison non-Medicaid enrollment was associated with late stage at diagnosis of 42.2%.[5]

Women who enrolled in Medicaid during the month of diagnosis were nearly 3 times more likely to have late stage disease than non-Medicaid enrolled women (adjusted OR 2.84; 95% CI = 1.94 – 4.17; $p < .05$). Women enrolled in months 1-11 and continuously in all 12 months prior to diagnosis had less risk of presenting with late stage disease (adjusted OR 1.34; 95% CI = 1.00 – 1.80; $p < .05$, and adjusted OR 1.08; 95% CI = 0.89 – 1.33; $p < .05$, respectively). Increasing age was also associated with increased risk of presenting with late stage disease: women aged 50 – 59 (adjusted OR 1.84; 95% CI = 1.57 – 2.17; $p < .05$), age 60 – 64 (adjusted OR 2.05; 95% CI = 1.61 – 2.62); $p < .05$).[5]

Late Stage Cancers in a Medicaid-insured Population

Bradley et al (2003)

Bradley et al, 2003,[6] utilized the Michigan Cancer Registry and state Medicaid enrollment files from 1996 – 1997 for a retrospective cohort study comparing timing of Medicaid enrollment and stage of cancer at diagnosis. Four common sites of cancer were

evaluated using this data: breast, cervical, colorectal, and lung. In the cervical cancer analysis women between the ages of 25 and 64 with a primary cancer were included. Non-Medicaid enrollees (n=2945) served as the reference group. Categories of Medicaid enrollment (n=918) were divided into 2 groups: women enrolled in Medicaid one or more months prior to the date of diagnosis were considered "Medicaid enrolled before diagnosis". Women enrolled in the same or later month as the cancer diagnosis were considered "Medicaid enrolled after diagnosis". (2003)[6]

Late stage cancer was defined as regional, distant, or invasive/unknown. Medicaid enrollment was associated with increased odds of late stage cervical cancer at the time of diagnosis compared to non-Medicaid enrolled women. Women who enrolled in Medicaid before diagnosis were 1.83 times more likely to present with late stage cervical cancer (adjusted OR 1.83; 95% CI = 1.28 – 2.63; $p < .01$). Women enrolling in Medicaid after diagnosis were 5.49 times more likely to present with late stage disease (adjusted OR 5.49; 95% CI = 3.71 – 8.11). (2003)[6]

Health Care Disparities and Cervical Cancer

Bradley et al (2004)

Bradley et al, 2004,[7] utilized the same data as the previous study (2003)[6], albeit with different headings, for a retrospective cohort study examining the incidence of cervical cancer, the stage of cervical cancer at diagnosis and survival between Medicaid-insured (n=1125) and non-Medicaid-insured women (n=3924). The sample was stratified by age, into 2 groups: those younger than 65 and those aged 65 and older. Women in the Medicaid group were categorized as "enrolled at diagnosis" if enrollment occurred one or

more months before diagnosis. Enrollment during the same month of diagnosis or later was considered to be "enrolled after diagnosis". (2004)[7]

Cervical cancer incidence was higher in the Medicaid-insured group compared to the general population. The incidence rate was higher in all age groups for women insured by Medicaid. The highest incidence for both groups was women between the ages 25-29 years. For this age group, Medicaid-insured women had an incidence rate of 2.43 per 1000, and the general population had a rate of 1.98 per 1000. (2004)[7]

The stage of cancer at diagnosis was defined as early (in situ or local) or late (regional or distant). In women under the age of 65, diagnosis of late stage cervical cancer was higher in the Medicaid group (10%) versus the non-Medicaid group (5%). Women enrolled in Medicaid also had a higher percentage die of cervical cancer (6%) compared to the non-Medicaid group (2%). Women aged 65 and older were more likely to present with late stage disease (45% vs. 29%) and to die from cervical cancer (29% vs. 18%). (2004)[7]

Predicted probabilities of late stage cervical cancer at diagnosis were higher for women enrolled in Medicaid in both age groups. In women under age 65 the probabilities between non-Medicaid, Medicaid enrollment at diagnosis, and Medicaid enrollment after diagnosis were 2%, 4%, and 8%, respectively. In women aged 65 and older the probabilities increased to 21%, 37%, and 58%. (2004)[7]

Hazard ratios were calculated to predict death from cervical cancer. In women younger than 65 years, the hazard ratio for age was 1.06 (95% CI = 1.04 – 1.09, $p < .05$). Women enrolled in Medicaid at the time of diagnosis had a hazard ratio of 1.77 (95% CI

= 1.02 – 3.07, p < .05). And for women enrolled after diagnosis the hazard ratio was 2.4 (95% CI = 1.49 – 3.86, p < .05). (2004)[7]

Women aged 65 and older had the following hazard ratios: age 1.04 (95% CI = 1.01 – 1.08, p < .05); Medicaid enrolled at diagnosis 1.15 (95% CI = 0.55 – 2.40, p < .05). Medicaid enrolled after diagnosis 1.24 (95% CI = 0.48 – 3.19, p < .05). (2004)[7]

Assessing the Effectiveness of Medicaid in Breast and Cervical Cancer Prevention

Koroukian (2003)

Koroukian[8] utilized the Ohio Medicaid enrollment files and the Ohio Cancer Incidence Surveillance System (OCISS) from 1996-1998 for a cross-sectional study comparing stage of breast and cervical cancer at the time of diagnosis between Medicaid-insured (n=357) and non-Medicaid-insured (n=1095) women. In the Medicaid-insured group, additional comparisons were made between the length and timing of Medicaid enrollment with the stage of cancer at diagnosis. Date of diagnosis was obtained from the OCISS and was used to create an enrollment history for the Medicaid group. Beneficiaries who were enrolled in the Medicaid program for at least 3 months prior to their cancer diagnosis were placed in the "prediagnosis" group (n=225). The "peridiagnosis" group (n=120) consisted of those who were enrolled in the two months before cancer diagnosis, at the time of diagnosis, or in the two months following diagnosis. Enrollment three months after diagnosis was the "postdiagnosis" group (n=12). Cases not matched between OCISS and the Medicaid enrollment files were identified as the "non-Medicaid" group. Additional variables of interest across all groups were race (African American vs. all others) and age (< 50 – 85+) at time of diagnosis.[8]

The stage of cervical cancer at diagnosis was stratified to local, regional, and distant. A larger percentage of Medicaid-insured women than non-Medicaid-insured women were diagnosed with late stage cervical cancer (local 52.1%, regional 36.7%, distant 11.2% vs. 66.3%, 27.9%, and 5.8%, respectively, $p < .001$). Stratification based on timing of enrollment in the Medicaid group yielded significant differences between each subgroup. Similarities were found between the non-Medicaid group and the prediagnosis Medicaid beneficiaries (local 66.3%, regional 27.9%, distant 5.8% vs. 61.3%, 32.0%, and 6.7%, respectively, $p < .001$). Disparities increased when comparing the peridiagnosis group and postdiagnosis group (local 35.0%, regional 45.8%, distant 19.2% vs. 50.0%, 33.3%, and 16.7%, respectively, $p < .001$). Differences in age were also apparent across the different groups. In the non-Medicaid group 77.7 percent of women were younger than 65 years. The prediagnosis group was closest to the non-Medicaid group with 76.4 percent younger than 65 years. Followed by the postdiagnosis group with 83.3 percent and the peridiagnosis group with 90.9 percent younger than 65 years.[8]

In the analysis of distant stage at diagnosis, the Medicaid prediagnosis group was used as a reference group. Women in the peridiagnosis group were 3.6 times more likely to be diagnosed with late stage disease (adjusted OR 3.6; 95% CI = 1.8-7.3). Likelihood of late stage disease was non-significant in the non-Medicaid and postdiagnosis groups (adjusted OR 0.9; 95% CI = 0.5 – 1.6, and adjusted OR 2.8; 95% CI = 0.5 – 14.2, respectively).[8]

DISCUSSION

The four studies[5-8] reviewed here differed in how they stratified the Medicaid-insured population. However, even with these differences, a pattern emerged of increased risk of late stage cervical cancer at the time of diagnosis dependent upon the timing of Medicaid enrollment. Taken as a whole, women enrolled in Medicaid had a higher risk of late stage disease at the time of diagnosis compared to non-Medicaid-insured women. In general, women enrolled in Medicaid prior to diagnosis, had a lower risk of late stage cervical cancer at the time of diagnosis when compared with women who enrolled after diagnosis.[5,7,8] Lower risk was also associated with the length of continuous Medicaid enrollment prior to diagnosis.[5,8]

While there are differences between these studies[5-8] in terms of the exact timing of enrollment in Medicaid, a trend of increased risk emerges for women whose enrollment is close to, on, or after diagnosis. All of the studies[5-8] demonstrated a substantially increased risk for those enrolled in Medicaid after diagnosis. By stratifying timing of enrollment to include those enrolled several months prior to diagnosis, O'Malley et al[5] and Koroukian[8] demonstrate the risk for Medicaid enrollees to be similar as for women in the non-Medicaid-insured groups. This is in stark contrast to the nearly doubling of risk seen in the Bradley et al, 2003,[6] study which categorized enrollment prior to diagnosis more broadly than the other studies.[5,8]

O'Malley et al[5] stratified women enrolled in Medicaid prior to diagnosis into 2 groups. Women who were enrolled continuously for all 12 months prior to diagnosis had an adjusted odds ratio that was not statistically significant when compared to non-Medicaid-insured women. Women enrolled for 1 – 11 months (intermittent) prior to

diagnosis had more risk comparatively (adjusted OR 1.34), but substantially less risk than those enrolled after diagnosis. The results from this study[5] suggest that continuous enrollment in Medicaid may be analogous to non-Medicaid enrollment in terms of risk of presenting with late stage disease. Koroukian[8] stratified the Medicaid-insured population into 3 groups, which yielded considerable differences in risk. In this study[8], the prediagnosis group (enrolled at least 3 months prior to diagnosis) along with non-Medicaid-insured women showed no significant differences in risk of presenting with late stage cervical cancer at the time of diagnosis. Bradley et al, 2003,[6] found that women enrolled at least one month or longer prior to diagnosis were nearly twice as likely to have late stage disease than women not enrolled in Medicaid. This finding demonstrates a much larger increase in risk in women who enrolled in Medicaid prior to diagnosis than the other studies.[5,8] However, it is not possible to differentiate if the increased risk is the same for all women who enrolled prior to diagnosis because it is unknown when women in this group were enrolled in Medicaid. It is possible that stratifying the timing of enrollment would yield a different result in terms of risk. These contradictory results underscore the need for future studies to stratify those enrolled prior to diagnosis to conclude if longer Medicaid and/or continuous enrollment carries less risk than enrollment just prior to diagnosis.

All of the studies[5,7,8] that examined the risk of late stage disease and Medicaid enrollment at the time of diagnosis found substantially increased risk within this group. O'Malley et al[5] found a nearly 3-fold increase in risk in this group. In Koroukian[8] the peridiagnosis group (enrollment 2 months before, at the time of diagnosis, and 2 months following diagnosis) had a statistically significant increase in risk (adjusted OR 3.6) of

late stage diagnosis. Bradley et al, 2004,[7] found an increased incidence in cervical cancer, increased probability of late stage cancer at diagnosis, and increased risk of death from cervical cancer among women enrolling in Medicaid at the time of diagnosis compared with non-Medicaid-insured women. This study[7] finds that for women under the age of 65, risk of death from cervical cancer is 1.77 times higher for women enrolled in Medicaid at the time of diagnosis. It should be noted that while this group was defined as women enrolling in Medicaid at the time of diagnosis, the timing of enrollment was actually one or more months prior to diagnosis, and thus may be underestimating the risk in women enrolled at the time of diagnosis as compared to the other studies.[5,8]

Three studies[6-8] examined the risk of late stage disease in women who enrolled in Medicaid after diagnosis. Koroukian[8] categorized women enrolled three or more months after diagnosis as the "postdiagnosis" group. This group showed no significant difference in risk compared to the non-Medicaid group, which is in contrast to the other studies,[6,7] and may be due to the small sample size. The postdiagnosis group in this study was quite small (12 out of 357 total), compared to the other Medicaid groups. In Bradley et al, 2003,[6] women younger than 65 years enrolled in Medicaid the same month or after diagnosis were 5 times more likely to present with late stage cervical cancer than women not enrolled in Medicaid. This is a striking increase in risk to women enrolling at the time of diagnosis or later. In order to better understand the substantially increased risk of this group, it would be of value to further stratify this second group into those enrolling at time of diagnosis and those women enrolling several months after diagnosis. Bradley et al, 2004,[7] also demonstrates a much greater risk of late stage diagnosis and death from cervical cancer for women under the age of 65 who were enrolled in Medicaid after

diagnosis (HR 2.4). Multiple factors could be contributing to this elevated risk of death aside from the association between late stage cancer at diagnosis and increased mortality. For instance, disenrollment from Medicaid, which would then limit access to care, is a potential variable that could also be a factor in the increased mortality rate in this group. Additional studies are needed to determine the factors involved in the increased risk of death in this group.

Interestingly, while age was associated with an increased risk in death in women aged 65 and older in this study,[7] Medicaid enrollment was not associated with a statistically significant increased risk of death despite an increased probability of late stage disease at the time of diagnosis (58% vs. 21% for non-Medicaid-insured). If this trend is indeed indicative of the survival rates in this older population, one possibility that may explain this difference is the potential for dual eligibility with Medicare,[10] which may yield more consistent access to health care compared with Medicaid alone. Additional studies examining mortality and the risk of late stage disease are needed, especially when compared to the increased risk of death in the younger Medicaid-insured population. The difference in the death rate from cervical cancer between these two age groups is significant as is the difference between the death rate and timing of enrollment.

A limitation shared by all of the studies[5-8] reviewed here was the inability to establish the insurance status of the non-Medicaid group. Whether women had private insurance, were underinsured, or uninsured is not known. What is known is that this group was not enrolled in Medicaid. Since the insurance status of this group was unknown, the non-Medicaid group could have included underinsured or uninsured women who were not enrolled in Medicaid. It is then possible that the inclusion of these

women in the non-Medicaid group could actually cause an underestimation of risk comparatively.

A second limitation was the varying criteria each study used for timing of enrollment. While a pattern emerged across all of the studies[5-8], that women enrolled in Medicaid had an increased risk of late stage diagnosis, the risk varied greatly between each study based upon the timing and length of Medicaid enrollment and how each group was stratified.

The GRADE assessment tool[12] was used to assess the quality of each study. The studies[5-8] included in this review were all observational studies and therefore, given an initial quality rating of low. None of the studies[5-8] were downgraded based on the GRADE criteria.

CONCLUSION

The results from this systematic review demonstrate a trend of increased risk of late stage cervical cancer for women whose enrollment in Medicaid is close to, on, or after diagnosis. The risk of late stage disease at the time of diagnosis was dependent upon the timing of Medicaid enrollment and increased significantly for women who enrolled at the time of, or after diagnosis. Continuous and/or prolonged enrollment prior to diagnosis was associated with less risk overall, and may be analogous to non-Medicaid-insured women. Risk of death from cervical cancer was significantly higher in women enrolled in Medicaid under the age of 65 years, but not for women aged 65 and older. More studies are needed to examine the relationship between the timing of Medicaid enrollment and late stage disease to allow for more effective targeting of at-risk

populations. The increased risk for women who enroll in Medicaid after diagnosis, as demonstrated in this review, underscores the need to increase outreach to underserved women who do not qualify for Medicaid until they have been diagnosed with cervical cancer or precancerous lesions.

References

1. Freeman HP, Wingrove BK. Excess Cervical Cancer Mortality: A Marker for Low Access to Health Care in Poor Communities. Rockville, MD: National Cancer Institute, Center to Reduce Cancer Health Disparities, May 2005. NIH Pub. No. 05–5282.

2. NIH Cervical Cancer Fact Sheet. National Institutes of Health. http://report.nih.gov/nihfactsheets/ViewFactSheet.aspx?csid=76. Accessed April 3, 2012.

3. Fast Stats: An interactive tool for access to SEER cancer statistics. Surveillance Research Program, National Cancer Institute. http://seer.cancer.gov/statfacts/html/cervix.html. Accessed on April 3, 2012

4. Tangka,F.K.; O'Hara,B.; Gardner,J.G.; Turner,J.; Royalty,J.; Shaw,K.; Sabatino,S.; Hall,I.J.; Coates,R.J. Meeting the cervical cancer screening needs of underserved women: the National Breast and Cervical Cancer Early Detection Program, 2004-2006. Cancer Causes & Control, 2010, 21, 7, 1081-1090

5. O'Malley,C.D.; Shema,S.J.; Clarke,L.S.; Clarke,C.A.; Perkins,C.I. Medicaid status and stage at diagnosis of cervical cancer. *Am.J.Public Health*, 2006, 96, 12, 2179-2185

6. Bradley,C.J.; Given,C.W.; Roberts,C. Late stage cancers in a Medicaid-insured population. *Med.Care*, 2003, 41, 6, 722-728

.Bradley,C.J.; Given,C.W.; Roberts,C. Health care disparities and cervical cancer .7 *Am.J.Public Health*, 2004, 94, 12, 2098-2103

8. Koroukian,S.M. Assessing the effectiveness of Medicaid in breast and cervical cancer prevention. *Journal of Public Health Management & Practice*, 2003, 9, 4, 306-314

9. Kaiser Commission on Medicaid and the Uninsured. Kaiser Family Foundation. http://www.kff.org/medicaid/upload/7235-04.pdf. Published 2010-06-02. Accessed April 12, 2012

10. Medicaid's Role for Women Across the Lifespan: Current Issues and the Impact of the Affordable Care Act. Kaiser Family Foundation. http://www.kff.org/womenshealth/upload/7213-03.pdf. Published 2012-01-06. Accessed April 12, 2012.

11. Roetzheim,R.G.; Pal,N.; Tennant,C.; Voti,L.; Ayanian,J.Z.; Schwabe,A.; Krischer,J.P. Effects of health insurance and race on early detection of cancer. *J.Natl.Cancer Inst.*, 1999, 91, 16, 1409-1415

12. GRADE Working Group. http://www.gradeworkinggroup.org/index.htm. Published 2005-2011. Accessed April 9, 2012

13. Chien,L.N.; Adams,E.K.; Yang,Z. Medicaid enrollment at early stage of disease: the Breast and Cervical Cancer Prevention and Treatment Act in Georgia. *Inquiry*, 2011, 48, 3, 197-208

TABLE I. Characteristics of Reviewed Studies

Quality Assessment						Summary of Findings			Importance
						Number of Patients		Quality	
Design	Limitations	Indirectness	Imprecision	Inconsistency	Other Considerations	Case	Control		
O'Malley,C.D.; Shema,S.J.; Clarke,L.S.; Clarke,C.A.; Perkins,C.I. Medicaid status and stage at diagnosis of cervical cancer. *Am.J.Public Health*, 2006, 96, 12, 2179-2185									
Retrospective Cohort	No limitations	No indirectness	No imprecision	No inconsistencies	Underestimation of risk	888	3794	⊕⊕OO Low	Critical
Bradley,C.J.; Given,C.W.; Roberts,C. Late stage cancers in a Medicaid-insured population. *Med.Care*, 2003, 41, 6, 722-728									
Retrospective Cohort	No limitations	No indirectness	No imprecision	No inconsistencies	Underestimation of risk	918	2945	⊕⊕OO Low	Critical
.Bradley,C.J.; Given,C.W.; Roberts,C. Health care disparities and cervical cancer *Am.J.Public Health*, 2004, 94, 12, 2098-2103									
Retrospective Cohort	No limitations	No indirectness	No imprecision	No inconsistencies	Underestimation of risk	1125	3924	⊕⊕OO Low	Critical
Koroukian,S.M. Assessing the effectiveness of Medicaid in breast and cervical cancer prevention. *Journal of Public Health Management & Practice*, 2003, 9, 4, 306-314									
Cross-sectional study	No limitations	No indirectness	No imprecision	No inconsistencies	Underestimation of risk	357	1095	⊕⊕OO Low	Critical

TABLE II. Summary of Finding

Number of participants with late stage disease[+]			**Risk of late stage diagnosis**[**]			
Study	**Non-Medicaid Enrolled (%)**	**Medicaid Enrolled (%)**	**Medicaid enrolled before diagnosis**		**Medicaid enrolled at time of diagnosis**	**Medicaid enrolled after diagnosis**
O'Malley et al[5] (2006)	1599 (42.1)	451 (50.8)	Adjusted OR (95% CI)			
			1-11 mo before diagnosis	12 mo before diagnosis		
			1.34 (1.00-1.80)	1.08 (0.89-1.33)	2.84 (1.94-4.17)	--
Bradley et al[6] (2003)	157 (5)	102 (11)	OR (95% CI)			
			1.83 (1.28-2.63)		--	5.49 (3.71-8.11)
Bradley et al[7] (2004)	Women < 65 y/o		Predicted probabilities[++]			
	178 (4.88)	109 (10.25)	--		4%	8%
					Prediction of Death Hazard Ratio (95% CI)	
					1.77 (1.02-3.07)	2.4 (1.49-3.86)
	Women 65 y/o or older		Predicted probabilities[++]			
	79 (28.52)	28 (45.16)	--		33%	58%
					Prediction of Death Hazard Ratio (95% CI)	
					1.15 (0.55-2.40)	1.24 (0.48-3.19)
Koroukian[8] (2003)	369 (33.7)	171 (47.9)	Adjusted OR (95% CI)			
			1		3.6 (1.8-7.3)	2.8 (0.5-14.2)

[+] Late stage disease defined as regional or distant or (invasive/unknown)
[++] Probability for non-Medicaid insured: women < 65 y/o is 2%; women 65 y/o or older is 27%
[**] Studies had differing criteria for each enrollment period

FIGURE I: Cervical Cancer Mortality Rates by County[1]